

Astrobiology Missions

Iron oxides inside metallic ores of the Río Tinto Mars analog as possible traces of chemolithotrophic cryptobiospheres. First geobiology results of MARTE project.

David C. Fernández-Remolar¹, Felipe Gómez¹, Elena González-Toril¹, Olga Prieto-Ballesteros¹, Nuria Rodríguez¹, Ricardo Amils¹, Javier Gomez-Elvira¹, Stephen Dunagan², Todd Stevens³, Howard Cannon⁴, Jhony Zavaleta⁵, Brian Glass⁶, Larry Lemke⁷ and Carol Stoker⁸

¹Centro de Astrobiología, INTA-CSIC, Ctra. Ajalvir km. 4, 28850 Torrejón de Ardoz, Madrid, Spain (fernandezrd@inta.es)

²NASA Ames Research Center, Code SG, Moffett Field, CA. 94035, (Stephen.Dunagan@nasa.gov)

³Portland State University, Portland OR (tstevens@gorge.net); ⁴Centro de Astrobiología, Madrid, Spain (ramils@trasto.cbm.uam.es)

⁴NASA Ames Research Center, Code IC, Moffett Field, CA. 94035, (hcannon@mail.arc.nasa.gov)

⁵NASA Ames Research Center, Code SS, Moffett Field, CA. 94035, (jzavaleta@mail.arc.nasa.gov)

⁶NASA Ames Research Center, Code IC, Moffett Field, CA. 94035, (Brian.J.Glass@nasa.gov)

⁷NASA Ames Research Center, Code SF, Moffett Field, CA. 94035, (llemke@mail.arc.nasa.gov)

⁸NASA Ames Research Center, Code SS, Moffett Field, CA. 94035, (Carol.R.Stoker@nasa.gov)

Searching for recent life on Mars requires accessing to areas that are protected against the extreme climatology of its surface. These mild regions are reasonably believed to be underground. However, subsurface exploration of Mars have to overcome serious challenges related to detecting subsurface life with planetary probes, and the development of technology for sounding, sampling and analyzing the hidden areas. MARTE project (Mars Analog Research and Technology Experiment) has been focused to face these challenges developing novel technology for sounding Mars and detecting subsurface life if exists (Stoker *et al.*, 2003).

One of the previous tasks of MARTE has been to sound the basement of a Mars analog, the Río Tinto Basin, in order to extract the subsurface biology and geobiology information using solely standard technology. Río Tinto underground is made of successions of volcanosedimentary stacks (Leistel *et al.*, 1998) having recorded an active hydrothermal history in the form of metallic ores. By considering the geological and biological properties of the basin (López-Archilla *et al.*, 2001; González-Toril *et al.*, 2003), it has been hypothesized the existence of a chemolithotrophic bioreactor that mediates the chemical conditions of the river.

According to surface (Fernández-Remolar *et al.*, 2003) and subsurface data obtained by geophysical techniques, five sites were selected for the standard sounding of the Río Tinto basement. During 2003, two of these five sites were drilled obtaining 165.35 and 49 meters. First interpretations of cores suggest the existence of different microbial habitats possibly depending on water availability, reduced minerals and oxygen content.

References

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